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# Science Flight Report

## Operation IceBridge Antarctica 2010



**Flight:** F08

**Mission:** PEN23R – northern segments

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### Flight Report Summary

<b>Aircraft</b>	<b>DC-8 (N817NA)</b>
<b>Flight Number</b>	110113
<b>Flight Request</b>	118003
<b>Date</b>	Saturday, November 13, 2010 (Z), Day of Year 317
<b>Purpose of Flight</b>	Operation IceBridge Mission PEN23R shortened
<b>Take off time</b>	12:24:09 Zulu from Punta Arenas (SCCI)
<b>Landing time</b>	20:40:05 Zulu at Punta Arenas (SCCI)
<b>Flight Hours</b>	8.4
<b>Aircraft Status</b>	Airworthy.
<b>Sensor Status</b>	All installed sensors operational.
<b>Significant Issues</b>	None
<b>Accomplishments</b>	<ul style="list-style-type: none"><li>• Low-altitude survey (1,500 ft AGL) of several outlet glaciers on the western side of the Antarctic Peninsula.</li><li>• Completed the shortened mission plan as expected.</li><li>• ATM, MCoRDS, Snow and Ku-band radars, gravimeter, LVIS, POS/AV, and DMS were operated on the survey lines.</li><li>• Cross line over Crane Glacier for MCoRDS ice thickness determination.</li><li>• Conducted two ramp passes at Punta Arenas airport for ATM, LVIS and DMS instrument calibration (1,000 ft AGL).</li><li>• Successfully tested new software features in snow and Ku-band radar over Drake Passage at 39,000 ft. A surface reflection was clearly visible.</li><li>• Conducted pitch and roll maneuvers for LVIS calibration over Drake Passage.</li></ul>
<b>Geographic Keywords</b>	Antarctica, Drygalsky Glacier, Hektoria Glacier, Crane Glacier, Flask Glacier, Leppard Glacier, Eden Glacier, Lurabee Glacier, Clifford Glacier
<b>ICESat/CryoSat Track</b>	Several 183-day orbit ICESat tracks, which were first flown prior to the 2003 ICESat launch.
<b>Repeat Mission</b>	Yes. Parts of 2009 missions.

## Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
<b>ATM</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	45 GB	None
<b>MCoRDS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1 TB	None
<b>Snow Radar</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	196 GB	None
<b>Ku-band Radar</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	218 GB	None
<b>LVIS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	55 GB	None
<b>DMS</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	44.6 GB	None
<b>POS/AV (510 + 610)</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2 GB	None
<b>Gravimeter</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	80 MB	None
<b>DC-8 Onboard Data</b>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	40 MB	None

### Mission Report (Michael Studinger, Mission Scientist)

Today's mission is an amalgamation of parts of the 2009 Peninsula 2 and 3 missions. We have removed most of the profiles over the Larsen-C Ice Shelf from those two missions, with the exception of one line which connects a number of field camps and AWS stations, some of which will be occupied during the 2010 season. The main purpose of this mission is to re-occupy many flight lines such as several glaciers that feed into the old Larsen-B embayment, including Leppard, Flask, Crane, and Hektor, and one into Larsen-A (Drygalski). Most of these lines were first occupied by ATM/KU in 2002, and all were occupied during 2009 IceBridge.

The weather conditions over the remaining target areas were poor this morning with the "best" conditions over Pine Island Area and the northern Peninsula. We quickly decided against a Pine Island Glacier mission after the morning weather brief because of dense cloud cover at low elevation. The weather forecast for the Antarctic Peninsula was the best that we have seen since we are here, which does not mean that it was good. We decided to fly the PEN 23 mission in reverse. We expected from the AMPS model, the MODIS imagery and the weather brief to run into scattered clouds in the northern part towards the crest of the Peninsula and we also expected to lose the entire southern end from the Fleming Glacier. The weather during the mission was what we had expected. We decided to launch this morning because there was a good chance that we will collect a good amount of data along many glaciers and the survey time versus the transit time was worth the trip. We had planned to head down to the southern end of the Larsen C Ice Shelf and keeping an eye on the weather situation on targets of opportunity of any glaciers from last year's survey that flow into the western side of the Larsen C Ice Shelf. The ceiling there was below the peaks and we confirmed this by looking at a recent MODIS image that we downloaded during the mission. We decided not to try any of these glaciers and return to Punta Arenas.

The clouds were over the upstream parts of the glacier where the least change is happening. The low clouds sometimes required line deviations in steering the aircraft through holes in the scattered cloud cover. Over Flask Glacier we did a 360° turn to lower the flight elevation with the flaps extended and the landing gear down to slow down the aircraft.

We carefully avoided the bird nesting areas at Eden Glacier, Cape Casey, and Anderson Glacier. The closest we came was 4.6 nautical miles while flying well above the mountain peaks. These nesting areas are not listed in the 2006 Wildlife Awareness Manual, but we have been made aware of their locations in last year's environmental impact assessment.

The flight along the shortened mission plan collected good data with all instruments. The pilots did a great job finding gaps in the clouds.

**Individual instrument reports from experimenters on board the aircraft:**

**ATM:** Both ATM system worked well and collected good data along the survey line, except for some areas with clouds..

**MCoRDS:** The MCoRDS radar worked well and collected 1 TB of data.

**Snow and Ku-band radar:** Worked well. The first ¼ of the line was challenging due to the necessary changes in flight elevation due to topography. Good data was collected along the remaining ¾ of the line.

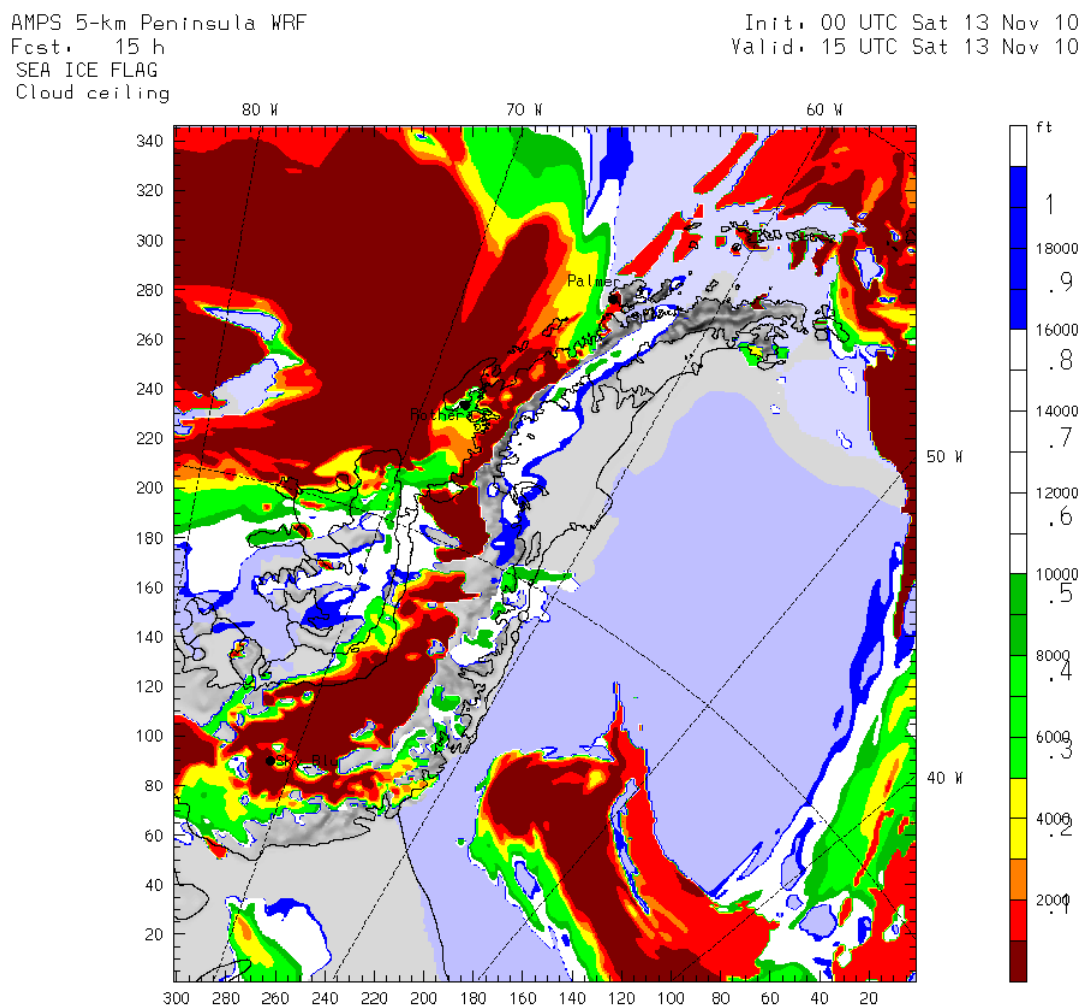
**Gravimeter:** Worked well. No issues.

**DMS:** DMS worked well.

**LVIS:** The LVIS system worked very well. No issues with the window on today's flight.

**POS/AV:** Systems worked well. No issues.

**DC-8 on board data:** Worked well



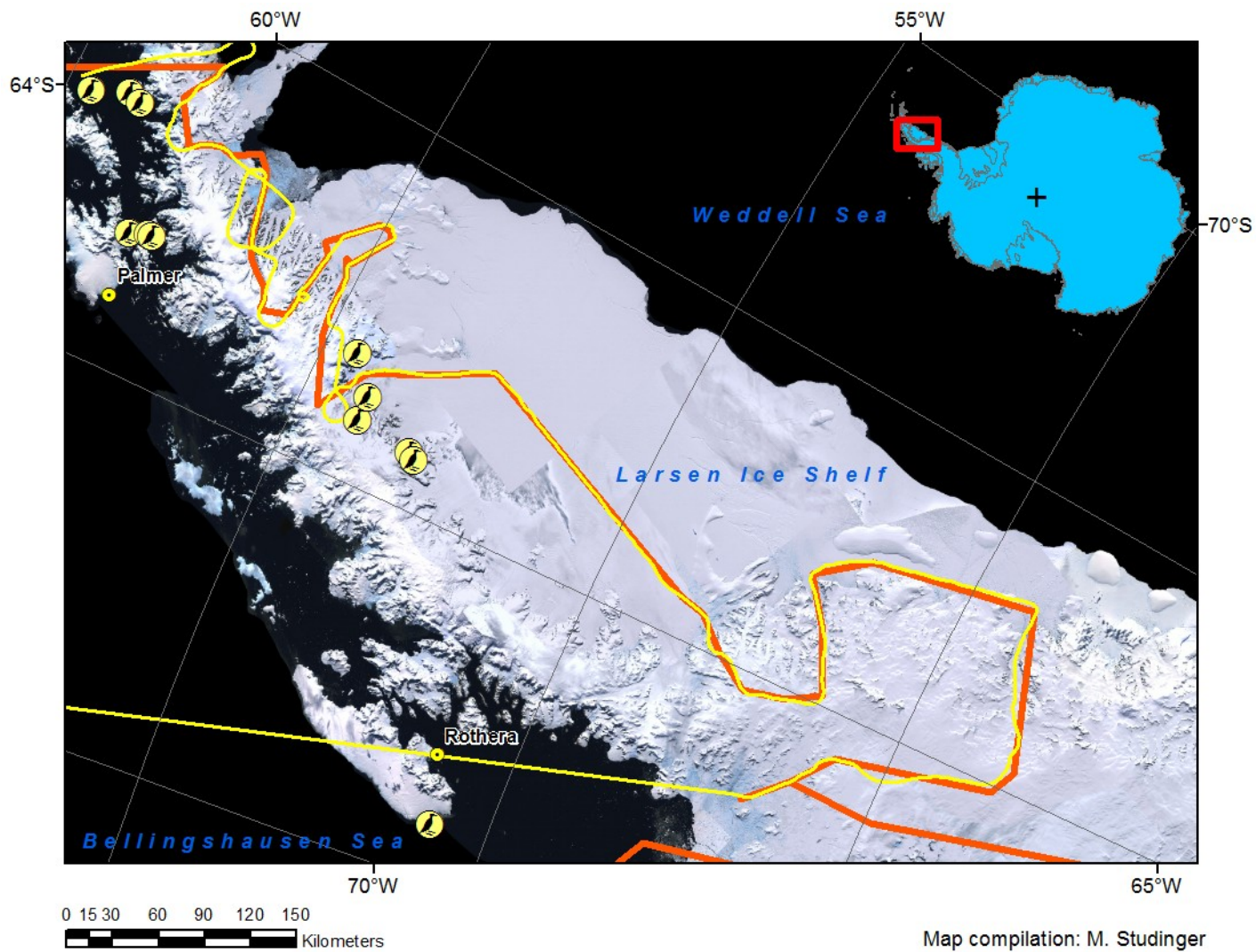


Figure 2: Flight path of today's mission over the Antarctic Peninsula.